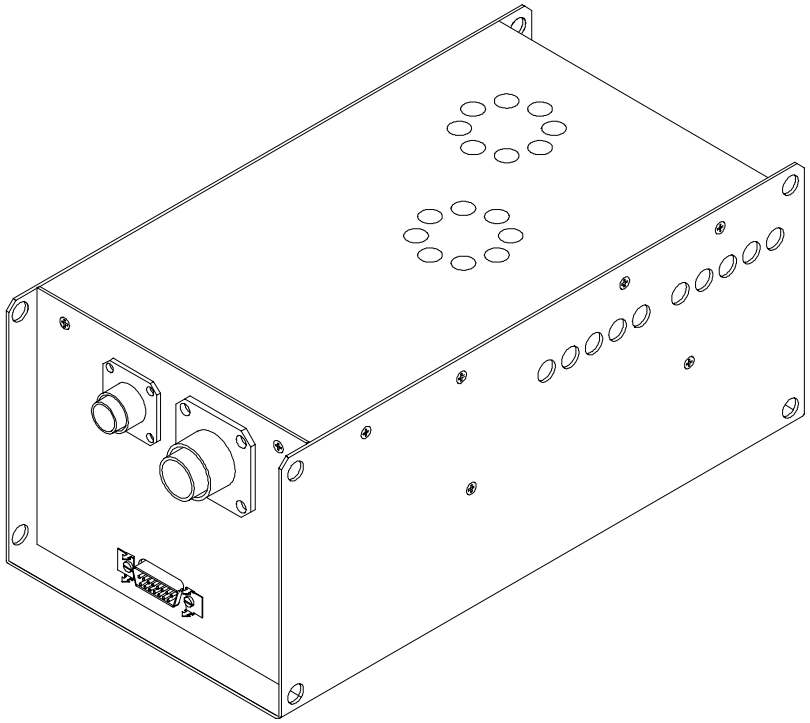
Installation Manual

Model #: PA-475-A (-B) (-C)

Audio Amplifier

Document #540021



AUDIO INTERNATIONAL INC.

7300 Industry Drive, North Little Rock, AR 72117
Phone: 501-955-2929 Fax: 501-955-2988
www.audiointl.com

Document Revision History

Rev. Level	Date	Description
IR	11/1997	Initial Release
A	11/1998	ECN #3004
B	3/1999	ECN #3427
C	4/2000	ECN #4675

Reference Documents

Document #	Drawing #	Description
N/A	521450	PA-475-A (-B) (-C) Outline Drawing

Service Bulletin List

Service Bulletin #	Subject	Manual Revision	Revision Date

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MODEL # PA-475-A (-B) (-C)

Audio Amplifier

1.0 General Information

1.1 Introduction

This manual contains information for the proper installation and operation of the Audio International, Inc. (AI) Audio Amplifiers, Models # PA-475-A, PA-475-B, and PA-475-C. Also included are physical and electrical characteristics of the unit.

1.2 Purpose of the Equipment

The PA-475-A, PA-475-B, and PA-475-C are Class “D” stereo, audio amplifiers that deliver high performance, excellent frequency response, and clear sound quality. The units have small footprints and generate little heat yet can produce dual output, high-power, high fidelity sound.

1.3 Operational Features

Listed below are key features of the PA-475-A, PA-475-B, and PA-475-C:

- Solid state circuitry
- Small footprint
- Minimal heat generation
- Dual output, high-power, high fidelity sound
- Automatic speaker turn ‘ON’ and PA audio level setting when PA interface is activated
- Lightweight, compact
- Specially designed to meet aircraft standards

1.4 Optional Equipment

Audio International, Inc. offers a complete line of speaker systems to enhance any aircraft entertainment system. As an industry leader in aviation entertainment systems, Audio International, Inc. can offer the perfect combination for the quietest listening and the highest quality in personal audio entertainment.

Contact your AI representative for details.

2.0 Application

2.1 Introduction

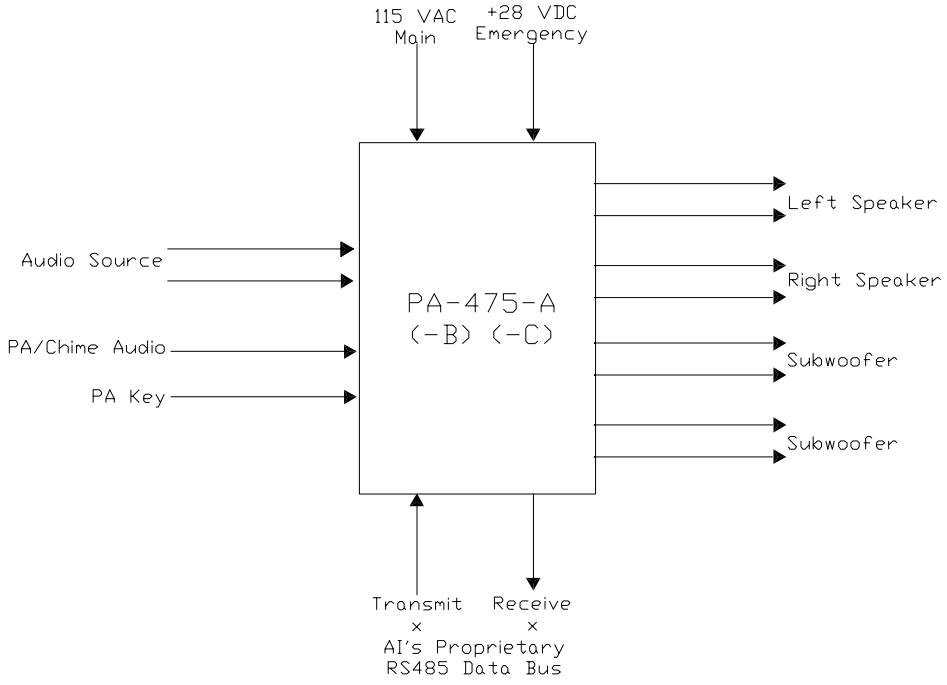
The PA-475-A, PA-475-B, and PA-475-C are audio amplifiers that will produce stereo audio output for the entertainment system and monaural audio for page / chime. Up to four (4) midrange / tweeter and four (4) subwoofers can be connected to an amplifier.

Each amplifier is designed to interface with AI's proprietary RS485 serial data bus allowing all entertainment switch panels to communicate with the audio amplifier.

The differences between the units is as follows:

- The PA-475-A has the capability of producing four (4) channels, 75 watts RMS peak output, 150 maximum per channel output power. Output impedance 4-ohms per channel. Electric crossover low range 20 – 135 Hz, high range 135 – 20 kHz.
- The PA-475-B has the capability of producing four (4) channels, 50 watts RMS peak output, 100 maximum per channel output power. Output impedance 4-ohms per channel. Electric crossover low range 20 – 135 Hz, high range 135 – 20 kHz.
- The PA-475-C has the capability of producing four (4) channels, 50 watts RMS peak output, 100 maximum per channel output power. Output impedance 4-ohms per channel. Electric crossover low range 20 – 300 Hz, high range 300 – 2 kHz

2.2 Block Diagram – Typical Application



3.0 Installation

3.1 Prior to Installation

Prior to installation, the following items should be considered:

3.1.1 During the design and layout of the aircraft cabin, careful consideration of the location of this module is necessary. Some of the items to be considered include:

- Space
- Available power supply
- Environmental conditions (temperature, humidity, etc.)
- Length of cable runs

3.1.2 The PA-475-A (-B) (-C) shall be installed to conform to the standards designated by the customer, installing agency, and existing conditions as to the unit location and type of installation.

3.1.3 Mounting screws are required to secure the unit. Refer to Section 6.0, Reference Drawings, for mounting hole diameters and configuration.

3.1.4 The purpose of the audio amplifier is to compensate for low level audio signals and “amplify” them to a high level. The amplifier will be most effective when the interior is thoroughly furnished and all pieces of furniture are in place.

3.1.5 The unit generates minimal heat. Allow a minimum of ½ inch air space around the amplifier due to heat generation.

3.2 Unpacking and Inspection

Carefully open the packaging and remove the unit. Verify that all components have been included in the package per the packing list. Inspect the unit for damage. Retain the packing materials and packing list.

If damage has occurred during shipping, a claim must be filed with AI within 24 hours and a “Return Request Authorization Number” must be obtained from AI. Refer to the front cover of this manual for address and telephone number of Audio International. Repackage the unit in its original packaging materials and return it to AI following instructions given by the AI representative. If no return is necessary, retain the packing materials for storage or reshipment if necessary.

3.3 *Cautions and Warnings*

3.3.1 It is important to do a pin-to-pin power and ground check on all connectors. Ensure that power and ground are applied only where specified. Damage to the unit may result if power or ground is applied to the wrong points.

3.3.2 **DO NOT** connect or disconnect the module while power is applied.

3.3.3 **DO NOT** remove any factory-installed screws. Damage to the units may result and void any warranties.

3.3.4 **ESD** (Electro Static Discharge) guidelines shall be followed.

3.4 Wiring Requirements

3.4.1 Introduction

The installing agency shall supply and fabricate all external cables and mating connectors. The length and routing of external cables must be carefully studied and planned before attempting installation of the equipment. Allow adequate space for installation of cable and connectors. Avoid sharp bends and placing cables near aircraft control cables. Maintain a minimum clearance of three (3) inches from any control cable. If wiring is run parallel to combustible fluid or oxygen lines, maintain a separation of six (6) inches between the lines.

3.4.2 Power Wires

All power and ground wires shall be 18 AWG (minimum). Power ground wires shall be grounded within twelve (12) inches of the unit. All wires shall be in accordance with **MIL-W-22759** or equivalent. Protect power wires with circuit breakers or fuses located close to the electrical power source bus.

3.4.3 Input Cables

All input cables are 22 AWG (minimum) twisted shielded pair with the cable shields properly grounded. Twisted shielded cable shall be in accordance with **MIL-W-27500** or equivalent.

3.4.4 Output Cables

All output cables are 20 AWG (minimum), 16 – 18 AWG preferred. Output cables require twisted, shielded pair with the cable shields properly grounded. Twisted shielded cable shall be in accordance with **MIL-W-27500** or equivalent.

3.4.5 Data Bus Lines

All data bus connections require twisted shielded cable with the cable shields properly grounded. Twisted shielded cable must be in accordance with **MIL-W-27500** or equivalent. The wire size for the conductors in this cable is to be 22 AWG (minimum). The shield is to be connected wherever a shield pin is provided. Shield terminations are to be made as close to the connector pin as possible. In the event shield pins are not provided, the data bus shield must be terminated per AI's proprietary RS485 specification.

All equipment on the RS485 data bus shall be connected in a "daisy-chain" configuration. AI's proprietary RS485 serial data bus specification is available upon request.

3.5 Physical Characteristics

3.5.1 Refer to Section 5.0 for unit dimensions.

3.5.2 Refer to Section 6.0 for attachment points.

3.5.3 When mounting the unit, allow sufficient space for mating connectors.

3.6 Electrical Characteristics

3.6.1 Refer to Section 5.0 for electrical specifications.

3.6.2 P1 is an 11-pin connector. The signals interfaced through P1 are left / right speaker, +28 VDC emergency power and woofer outputs. The emergency +28 VDC power input is required for cabin page and chime functions in case of power failure.

3.6.3 P2 is a 15-pin connector. The signals interfaced through P2 are the entertainment inputs of left / right audio input, PA/Chime, data ID, and RS485 data bus.

The device ID pins are used to provide a unique address on the RS485 data bus. These are binary ID pins and will allow up to four modules to be installed on the aircraft RS485 data bus.

3.6.4 P3 is a 3-pin connector. The signal interfaced through P3 is 115 VAC power.

3.7 Mating Connector Information

All wiring harnesses to the unit are supplied and fabricated by the installing agency.

Pin #	Part Number	Description
P1	MS3126F-18-11S	Mating Connector
P2	RD15F10HVL0	Mating Connector
P3	MS3126F-10-6S	Mating Connector

3.8 Pinout Assignment Descriptions

P1	
Pin #	**Description**
A	Left Speaker HI
B	Left Speaker LO
C	Right Speaker HI
D	Right Speaker LO
E	Woofer 1 HI
F	Woofer 1 LO
G	Woofer 2 HI
H	Woofer 2 LO
J	Emergency +28 VDC
K	Ground
L	Ground

P2	
Pin #	**Description**
1	Left Audio +
2	Left Audio -
3	Ground
4	Right Audio +
5	Right Audio -
6	Ground
7	Ground
8	Data ID (1)
9	Data ID (2)
10	PA Audio +
11	PA Audio -
12	Ground
13	PA Key Ground In
14	CMS Data Bus A
15	CMS Data Bus B

P3	
Pin #	**Description**
A	115V ACH 400 Hz
B	115V ACN 400 Hz
C	Ground
D	N/C
E	N/C
F	N/C

3.9 Post-Installation Test

With the aircraft power “ON”, test the audio amplifier. Any unit connected to the RS485 data bus may be used to test proper operation of the unit.

While an entertainment audio unit is sending audio signals through the amplifier, key and speak into a microphone to ensure that the page / chime overrides the entertainment audio. Ensure all microphones are tested. Verify that the briefer audio can be heard through the speakers.

Remove power from the amplifier and verify that the +28 VDC emergency power is supplied to the amplifier. Verify that the subwoofers are disabled while emergency power is applied. Ensure that PA audio can be heard in the speaker system from all respective microphones.

4.0 Troubleshooting Guide

General Troubleshooting Procedures

Many problems can be isolated with the following general techniques:

- To verify power to the unit, recheck 115 VAC and +28 VDC is applied to the proper pins on the unit. Use a voltmeter to verify correct level.
- Reset by removing power from the unit for at least one minute and reapply power. Verify the problem still exists.
- Recheck all connections to the unit for security. Check all harness runs for possible pinching. Recheck all pinouts for application accuracy.

Should difficulties arise in the installation or operation of the unit, contact Audio International, Inc. product support.

5.0 Specifications

Unit Specifications

Physical Specifications	
Housing	Aluminum
Dimensions (L x W x H)	9.3” x 4.9” x 4.0” 23.6cm x 12.5cm x 10.2cm
Weight	PA-475-A 5.1 lbs / 2.31 kg PA-475-B (-C) 5.3 lbs / 2.40 kg

Electrical Specifications		
Power	2.5 A nominal, 5A maximum @ 115 VAC 60-400Hz	
Emergency Power	+28 VDC Page / Chime	
Data Bus Type	AI Proprietary RS485	
Electric Crossover / Channel Output	PA-475-A	Low Range: 20 – 135 Hz High Range: 135 – 20 kHz 4-channel, 75 watts RMS peak output, 150 maximum per channel
	PA-475-B	Low Range: 20 – 135 Hz High Range: 135 – 20 kHz 4-channel, 50 watts RMS peak output, 100 maximum per channel
	PA-475-C	Low Range: 20 – 300 Hz High Range: 300 – 20 kHz 4-channel, 50 watts RMS peak output, 100 maximum per channel
Output Impedance	4-ohms per channel	

6.0 Reference Drawings

The following diagrams show the unit dimensions and connector locations for the PA-475-A (-B) (-C). All dimensions are shown in inches.